

REMARKS

In response to the outstanding office action, independent claim 1 has been amended to specifically require that the trim pads are solder-wettable.

Claims 1-9 and 16-18 were rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,327,158 B1 in view of US Pub. 2003/0127502 A1 issued to Kelkar et al and Alvarez, respectively. These rejections are respectfully traversed.

It is respectfully submitted that the earlier Kelkar reference does not teach “applying an electrically insulating undercoating to the active surface of the wafer that directly covers the solder-wettable trim pads while leaving at least portions of the contact bumps exposed,” as recited in amended claim 1.

The relevant section of the Kelkar reference describes applying a non-solder-wettable, electrically conductive and non-corrosive protective cap to cover trim pads on an integrated circuit device so as to prevent bridging between the trim pads and adjacent contact pads as well as to prevent corrosion of the trim pads.

As acknowledged in the outstanding rejections, the earlier Kelkar reference does not disclose the use of a wafer level undercoating to cover exposed trim pads after a trimming operation. That is not surprising because the primary problems being addressed in the earlier Kelkar reference were to: (1) eliminate solder bridging between the contact pads and the trim pads; and (2) make the trim pads more resistant to corrosion. In order to accomplish these objectives, a non-solder-wetting corrosion resistant (e.g. titanium) protective cap was applied to the trim pads. As would be appreciated by those skilled in the art, the aforementioned problems are particularly relevant when the trim pads are exposed. That is, the earlier Kelkar reference primarily contemplated the use of the protective caps in embodiments that have exposed trim pads and particularly trim pads that are exposed at the time of singulation.

In contrast, the present invention takes a very different approach to protecting the trim pads. Specifically, an undercoating, such as an underfill material, is applied to the surface of the wafer, including the solder-wettable trim pads, after the dice have been tested and trimmed and after the wafer has been bumped. Although it is acknowledged that wafer level undercoat operations are generally known, it is respectfully submitted that nothing in the cited art would motivate those skilled in the art to make the combination articulated in the outstanding rejection. Specifically, since the earlier Kelkar reference presented a product having trim pads that were covered with a non-solder-wettable cap, it is respectfully submitted that these trim pads were well suited for use without an underfill material, and hence adding an undercoating to the teachings of the earlier Kelkar reference would be redundant for the purposes of the present invention. Moreover, amended claim 1 specifically requires that the electrically insulating undercoating be applied directly over the solder-wettable trim pads.

Thus, it is respectfully submitted that those of ordinary skill in the art would not in any way have been motivated by the Alvarez reference to modify the teachings of the earlier Kelkar reference in the manner that they have been combined in the outstanding rejection. In view of the foregoing, it is respectfully submitted that the outstanding rejections should be withdrawn for at least this reason.

CONCLUSION

In view of the foregoing it is respectfully submitted that the present application is now in condition for allowance. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,

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